

**COMMONWEALTH OF VIRGINIA  
Department of Environmental Quality  
South Central Regional Office**

**STATEMENT OF LEGAL AND FACTUAL BASIS**

Kyanite Mining Company  
Located off U.S. Hwy. 15 four mile south of U.S. Hwy. 60 in Buckingham County  
Permit No. (SCRO) 51-029-0005

Title V of the 1990 Clean Air Act Amendments required each state to develop a permit program to ensure that certain facilities have federal Air Pollution Operating Permits, called Title V Operating Permits. As required by 40 CFR Part 70 and 9 VAC 5 Chapter 80, Kyanite Mining Company has applied for a Title V Operating Permit for its Buckingham County facility. The Department has reviewed the application and has prepared a draft Title V Operating Permit.

Engineer/Permit Contact:

Date: September 21, 2004

Air Permit Manager:

Date: September 21, 2004

Air Permit Manager:

Date: September 21, 2004

## **FACILITY INFORMATION**

### Permittee

Kyanite Mining Company  
P. O. Box 486  
Dillwyn, Virginia 23936

### Facility

A kyanite mining and kyanite/mullite processing facility  
located off U.S. Hwy. 15 south of U.S. Hwy. 60 in Buckingham County

AIRS ID No. 51-029-0005

## **SOURCE DESCRIPTION**

SIC Code: 1459 - Facility mines kyanite ore on-site, crushes the kyanite ore, concentrates the kyanite mineral using wet extraction processes, and dries the concentrated kyanite and eliminates the iron oxides (pyrite) through a thermal oxidation/reduction process. During the thermal oxidation/reduction process, PM, PM-10, NO<sub>x</sub>, SO<sub>2</sub>, CO, VOCs, and HF are emitted. Kyanite is a naturally occurring aluminum silicate (Al<sub>2</sub>O<sub>3</sub>·SiO<sub>2</sub>) which is used as a refractory material and electrical insulator. The raw kyanite contains varying proportions of pyrite, quartz, and other waste products as impurities, which must be removed from the finished product. The raw kyanite, after primary and secondary crushing, is further crushed into a fine powder by either ball mills (dry) or rod mills (wet or dry) prior to the wet flotation process. The wet flotation process requires a finely divided product in order to separate the kyanite from the impurities. The particle size of the feed to the flotation process is determined by the grain size of the quartz, waste products, and pyrite impurities. The wet flotation process uses specific chemicals in a water bath (flotation cell), which have an affinity for a particular mineral. This process allows for rapid and economical separation of a valuable commodity from a waste product. Kyanite Mining Company (KMC) uses Tall oil fatty acid and xanthate in a two-state flotation process. The VOC, SO<sub>2</sub>, and particulate emissions from the flotation process are negligible. The waste products are pumped to solids settlement ponds. Some of the refined kyanite is calcined into mullite, a similar material with different physical properties. Both kyanite and mullite are used for high temperature refractory materials and high voltage electrical insulators. The kyanite mining and kyanite/mullite processing facility includes the following operations: the Willis Mountain kyanite plant, which was constructed in 1957; the East Ridge kyanite plant, which was built in 1974; and the Gieseke kyanite/mullite plant, which commenced construction in 1985, but the kiln has not been completed. These three operations meet the definition of a major source per 40 CFR 70.2; contiguous or adjacent property, same major SIC number, and common ownership. On October 18, 2002, a State Operating Permit was issued to KMC that limited annual emissions from this facility to below Prevention of Significant Deterioration (PSD) permitting levels. The permittee has taken limits on the annual throughput(s) of raw and finished kyanite, mullite production, fuel consumption, fuel sulfur content, and operating hours. In addition, the permittee has installed a variety of air pollution control strategies to limit annual emissions below PSD levels. The State Operating Permit (SOP) amendment was signed on April 7, 2003, and the applicable requirements of the amended SOP are reflected in the Title V and this Statement of Basis. An administrative SOP amendment was signed on September 13, 2004, which supersedes the permit dated April 7, 2003.

The facility is a Title V major source of PM, PM-10, SO<sub>2</sub>, NO<sub>x</sub>, and CO. This source is located in an attainment area for all pollutants, and is a PSD synthetic minor source.

## **COMPLIANCE STATUS**

The source's January 15, 2003 Title V permit application stated that the Dry Slot bin (Ref. G1b) and Upper Gieseke Mill building are not in compliance with the opacity limits specified in the October 8,

2002 permit. On February 3, 2003, the source has submitted a Compliance Schedule and narrative description of steps required bringing the Dry Slot bin (Ref. G1b) and Upper Gieseke Mill building into compliance by April 17, 2003.

## **EMISSION UNIT AND CONTROL DEVICE IDENTIFICATION**

The list of emission units is large, and a complete listing of the significant and insignificant emission units can be found in the Section II of Title V permit.

### Kyanite dryers and coolers (Ref. E5 and W4)

The East Ridge and Willis Mountain dryers convert the remaining iron pyrite ( $\text{FeS}_2$ ) to  $\text{Fe}_2\text{O}_3$ . The cooler (roaster), which is also a fuel burning emission unit, converts the  $\text{Fe}_2\text{O}_3$  to  $\text{Fe}_3\text{O}_4$  (magnetite), which is then removed from the kyanite by magnetic separation. The East Ridge dryer consists of; a Starnell Model 1015 fluid bed dryer (Ref. E5.1) rated at 30 tons/hr with a  $34 \times 10^6$  Btu/hr (heat input) burner which operates at 800 °F to 1,200 °F in series with an Allis Chalmers 10' x 100' rotary cooler (Ref 5.2) that combusts fuel without a burner, both rated at 30 tons/hr. Heat for the East Ridge dryer/cooler is derived from distillate oil, residual oil, and wood. The East Ridge dryer/cooler combination (Ref. E5) exhausts to a dedicated Croll-Reynold's wet electrostatic precipitator (Ref. EWESP) for particulate matter,  $\text{SO}_2$ , and HF control. The Willis Mountain dryer/cooler consists of a 4' x 60' rotary dryer (Ref. W4.1) with a  $13.8 \times 10^6$  Btu/hr (heat input) burner which operates at approximately 1,200 °F to 1,800 °F in series with a 5' x 60' rotary cooler (Ref. W4.2) that combusts fuel without a burner, both rated at 10 tons/hr. Heat for the Willis Mountain dryer/coolers is derived from distillate oil and residual oil. The Willis Mountain dryer/cooler combination (Ref. W4) exhausts to a dedicated Croll-Reynold's wet electrostatic precipitator (WWESP) for particulate matter (PM, PM-10), sulfur dioxide ( $\text{SO}_2$ ), and hydrogen fluoride (HF) control. The East Ridge and Willis Mountain dryers were permitted to modify and operate in the April 7, 2002 permit. Kyanite is not a listed mineral in §40 CFR 60.731, and the East Ridge and Willis Mountain dryers/coolers are not NSPS Subpart UUU, Calciners and Dryers in the Mineral Industries, affected facilities. After exiting the coolers, the finished kyanite is conveyed to an enclosed storage bin(s) for additional processing, bagging, or bulk loadout.

### Gieseke mullite kiln (Ref. G5)

The Gieseke plant has a L. F. Smith rotary kiln (Ref. G5) rated at 30 tons/hr with a  $47.6 \times 10^6$  Btu/hr (heat input) burner and two coolers (Ref. G6a-1, G6a-2) in series are still under construction. The Gieseke kiln and coolers are not operational. The Gieseke kiln (Ref. G5), will operate near 3,000° F, which alters the crystal structure of the kyanite to form mullite ( $3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$ ), which is also a refractory material. Since mullite is not a listed mineral in §40 CFR 60.731, the Gieseke kiln (Ref. G5) is not an NSPS Subpart UUU affected facility. Heat for the kiln is derived from distillate oil, residual oil, and coal. The coal mill (Ref. G10) was manufactured on October 6, 1955, which predates the October 24, 1974 promulgation date of 40 CFR 60 Subpart Y, Standards of Performance for Coal Preparation Plants, and has not been reconstructed or modified. The coal handling is not subject to the provisions of NSPS Subpart Y per §40 CFR 60.250(b). The coolers (Ref. G6a-1, G6a-2) are enclosed water-cooled vibrating pans, which reduces the temperature of the finished product to less than 200 °F. The cooled mullite is ground by a ball mill and conveyed to an enclosed storage bin(s) for either bagging or bulk loadout. The Gieseke kiln will exhaust to a dedicated wet electrostatic precipitator (WESP) or equivalent control device (Ref. GWESP) for particulate matter,  $\text{SO}_2$ , and HF control.

### Willis Mountain sand dryer (Ref. W6)

The Willis Mountain 5' x 20' sand (quartz) dryer (Ref. W6) is not an oxidation/reduction system, but a

thermal dryer for dehydrating manufactured sand, which is rated at 6 tons/hr and has a  $4.0 \times 10^6$  Btu/hr (heat input) burner. The internal temperature of the sand dryer is not sufficient to liberate  $\text{SO}_2$  or HF from the manufactured sand, so all  $\text{SO}_2$  emissions are from the combustion of fuel. Heat for the sand dryer (Ref. W6) is derived from distillate and residual oils. The PM and PM-10 emissions from the sand dryer are controlled by a wet cyclone (Ref. WCYC) having a design control efficiency of 85% and 60%, respectively. The wet cyclone does not control fuel derived  $\text{SO}_2$  emissions. The wet cyclone was constructed by KMC in 1987.

### IC powered dredge (Ref. Dredge)

This facility uses a dredge to remove the solids from the settlement ponds. The dredge uses a 525 HP diesel engine to power the pumps and move the dredge. The diesel engine combusts only distillate oils which contains less than 0.5% sulfur. There are no add-on controls for air pollutant emissions.

### Stone Processing Equipment

The East Ridge and Willis Mountain plants have raw kyanite processing facilities that include primary and secondary crushers, screens, material handling and storage equipment, wet mineral separation equipment, and finished kyanite processing equipment. The Gieseke plant is only capable of fine grinding, calcining, and packaging/bulk load-out of finished kyanite/mullite. Some of the individual stone processing emission units, either raw or finished kyanite, have very low uncontrolled particulate emissions. However, these emission units are part of an integrated stone processing system and cannot be operated independently. Therefore, the majority of the stone processing emission units are considered to be significant emission units. The wet processing equipment (flotation cells, spirals, hydrocyclones, etc.), with the exception of the rod mills, bucket elevators, and belt conveyors, are insignificant emission units. The SOP emissions control requirements, throughput limits, and opacity requirements are the basis for the stone processing applicable requirements for the Title V permit.

The raw kyanite ore processing equipment's particulate emission limits, up to the ball and rod mills, have been established using AP42 Sections 11.19.2, Non-Metallic Mineral Processing Emission Factors and wet suppression. There are no particulate emissions from the East Ridge and Willis Mountain raw kyanite ball and rod mill buildings since these processes are totally enclosed by the Flotation buildings. The particulate emission limits from the East Ridge, Gieseke, and Willis Mountain finished kyanite and mullite processing equipment have been established using AP42 Section 11.6 Portland Cement and Section 11.17 Lime Manufacturing emission factors, since these materials are very fine and dry. The majority of the stone processing equipment's emissions are fugitive, and the SOP does not limit the hourly particulate emissions. The particulate emissions from the NSPS affected facilities whose emissions are controlled by fabric filters have the NSPS Subpart OOO regulatory limit of 0.05 g/dscm and 7% opacity. The NSPS kyanite processing equipment with total enclosure have a "no visible emissions" opacity limit. The NSPS kyanite processing equipment with either no controls or partial enclosure have a 10% opacity limit.

The Title V permit identifies the specific particulate control strategy for each type of emission unit. The particulate emissions from raw kyanite ore processing equipment at the East Ridge and Willis Mountain plants are controlled by wet suppression. The finished kyanite and mullite processing equipment's particulate emissions are controlled by a combination of process enclosures, total enclosures, and fabric filters.

## EMISSIONS INVENTORY

A copy of the 2001 annual emission statement is attached. Emissions are summarized in the following tables.

Facility-wide 2001 Actual Emissions

2001 Criteria Pollutant Emission in Tons/Year				
VOC	CO	SO <sub>2</sub>	PM-10	NO <sub>x</sub>
5.7	142.4	90.8	18.2	37.1

2001 Facility-wide Hazardous Air Pollutant Emissions

Pollutant	2001 Hazardous Air Pollutant Emission in Tons/Yr
Hydrogen fluoride (HF)	5.2

**EMISSION UNIT APPLICABLE REQUIREMENTS** - East Ridge dryer/cooler, Gieseke kiln, Willis Mountain dryer/cooler, Willis Mountain sand dryer, IC-powered dredge, East Ridge plant, Gieseke plant, and Willis Mountain plant.

### East Ridge dryer/cooler (Ref. E5.1 and E5.2)

The East Ridge dryer/cooler's PM, PM-10, SO<sub>2</sub>, and HF emissions are to be controlled by a Croll-Reynold's WESP (Ref. EWESP) having a control efficiency of not less than 97.0 % for SO<sub>2</sub> and 99.0% for HF, which is best available control technology (BACT). On March 25, 2002, the source submitted an application to install a larger burner in the East Ridge dryer. The increase in the uncontrolled SO<sub>2</sub> emissions due to the installation of the larger burner to the dryer exceeded the 10 tons/yr exemption level per 9 VAC 5-80-11(E), which required a permit to modify and operate. The State Operating Permit includes the 9 VAC 5 Chapter 50 requirements in addition to the 9 VAC 5 Chapter 80 Article 5 requirements. The EWESP's filterable PM and PM-10 design control efficiency is rated at 99.9% and the short-term emissions are limited to 0.02 gr/dscf. Total PM and PM-10 emissions from the East Ridge dryer/cooler (Ref. E5.1& E5.2) are limited to 0.04 gr/dscf. The filterable and total PM and PM-10 limits represent BACT for particulate controls. Carbon monoxide emissions from the cooler (Ref. E5.2) are to be minimized by recirculating the exhaust gas back into the dryer (Ref. E5.1) burner. The dryer/coolers annual production is limited to 130,000 tons/yr and fuel consumption is limited to 2.56 x 10<sup>11</sup> Btus/yr of any combination of distillate oil, residual oil, and wood (calculated as the sum of each consecutive 12-month period). The maximum sulfur content of the distillate oil and residual oil is limited to 0.2% and 2.5% (wt), respectively. The hourly emissions from the dryer/cooler are limited to 43.08 lbs/hr of SO<sub>2</sub>, 27.00 lbs/hr of NO<sub>x</sub>, 63.00 lbs/hr of CO, 2.53 lb/hr of HF, and 10% opacity. Since the raw kyanite is a significant source of SO<sub>2</sub> and HF emissions, the permittee will sample the raw kyanite feed to the dryer/cooler on a daily basis for sulfur and fluoride analysis. The daily samples will be combined with subsequent daily samples and the composite sample will be analyzed at least once per month for total sulfur and fluoride content. On a monthly and annual basis, the permittee will calculate the controlled SO<sub>2</sub> and HF emissions from dryer/cooler using the results of the monthly sulfur and fluoride content of the raw kyanite samples collected and fuel sulfur content. In addition, the permittee will calculate the monthly and annual CO emissions using calculation methods approved by

the South Central Regional Office. The permittee will retain records of production, fuel consumption, predictive emissions monitoring (PEM), kyanite sulfur and fluoride content, fuel sulfur content, stack tests, operator training, semiannual compliance, and malfunctions. The Title V permit conditions located in Section III(A)(1) lists the specific applicable requirements for the East Ridge dryer/cooler. The EWESP's monitoring requirements will be discussed in the Monitoring Section.

#### Gieseke kiln (Ref. G5)

The Gieseke kiln's PM, PM-10, SO<sub>2</sub>, and HF emissions are to be controlled by a WESP (Croll-Reynolds) or equivalent control device (Ref. GWESP). The GWESP's SO<sub>2</sub> and HF emissions control efficiency is rated at not less than 97.0 % for SO<sub>2</sub> and 99.0% for HF, which is best available control technology (BACT) for this emission unit. The GWESP's filterable PM and PM-10 design control efficiency is rated at 99.9% and the short-term total PM and PM-10 emissions, including condensible matter, are limited to 0.02 gr/dscf, which is BACT for particulate emissions. The permittee shall submit a written statement including all pertinent stack parameters sufficient for computer modeling or submit approved computer modeling for the proposed Gieseke WESP (Ref. GWESP) or equivalent control device to the South Central Regional Office prior to commencement of construction of the control device in order to determine the ambient air impacts from the kiln. The kiln's annual production is limited to 65,000 tons/yr and fuel consumption is limited to  $2.71 \times 10^{11}$  Btus/yr of any combination of distillate oil, residual oil, and coal (calculated as the sum of each consecutive 12-month period). The maximum sulfur content of the distillate oil, residual oil, and coal is limited to 0.2%, 2.5%, and 2.3% (wt), respectively. The hourly emissions from the kiln are limited to 9.00 lbs/hr of SO<sub>2</sub>, 30.70 lbs/hr of NO<sub>x</sub>, 11.80 lbs/hr of CO, 0.16 lb/hr of HF, and 10% opacity. Since the kyanite is a source of SO<sub>2</sub> and HF emissions, the permittee will sample the raw kyanite feed to the kiln on a daily basis for sulfur and fluoride analysis. The daily samples will be combined with subsequent daily samples and the composite sample will be analyzed at least once per month for total sulfur and fluoride content. On a monthly and annual basis, the permittee will calculate the controlled SO<sub>2</sub> and HF emissions from kiln using the results of the monthly sulfur and fluoride content of the kyanite samples collected and fuel sulfur content. In addition, the permittee will calculate the monthly and annual CO emissions using calculation methods approved by the South Central Regional Office. The permittee will retain records of mullite production, fuel consumption, PEM, kyanite sulfur and fluoride content, fuel sulfur content, stack tests, operator training, semiannual compliance, and malfunctions. Within 180 days of the kiln becoming operational, the permittee will conduct an initial performance tests for PM, SO<sub>2</sub>, NO<sub>x</sub>, and CO and a visible emission evaluations (VEE) from the Gieseke WESP (Ref. GWESP) exhaust, using Reference Methods 5, 202, 6C, 7E, 9, and 10B, respectively (reference 40 CFR 60, Appendix A) or alternative test methods as approved by the South Central Regional Office, to determine compliance with the kiln's emission limits and GWESP's control efficiency requirements. The Title V permit conditions located in section III(B)(1) lists the specific applicable requirements for the Gieseke kiln. The GWESP's monitoring requirements will be discussed in the Monitoring Section.

#### Willis Mountain dryer/cooler (Ref. W4.1 and W4.2)

The Willis Mountain dryer/cooler's PM, PM-10, SO<sub>2</sub>, and HF emissions are to be controlled by a Croll-Reynold's WESP (Ref. WWESP) having a control efficiency of not less than 97.0 % for SO<sub>2</sub> and 99.0% for HF, which is best available control technology (BACT). On March 25, 2002, the source submitted an application to install a larger burner in the Willis Mountain dryer. The increase in the uncontrolled SO<sub>2</sub> emissions due to the installation of the larger burner to the dryer exceeded the 10 tons/yr exemption level per 9 VAC 5-80-11(E), which required a permit to modify and operate. The State Operating Permit includes the 9 VAC 5 Chapter 50 requirements in addition to the 9 VAC 5 Chapter 80 Article 5 requirements. The WWESP's filterable PM and PM-10 design control efficiency is rated at 99.9% and the short-term total PM and PM-10 emissions, including condensible matter, are

limited to 0.02 gr/dscf, which is BACT for particulate control. Carbon monoxide emissions from the cooler (Ref. W4.2) cooler are to be minimized by recirculating the exhaust gas back into the dryer (Ref. W4.1) burner. The dryer/cooler's annual production is limited to 55,000 tons/yr and fuel consumption is limited to  $9.82 \times 10^{10}$  Btus/yr of any combination of distillate oil and residual oil (calculated as the sum of each consecutive 12-month period). The maximum sulfur content of the distillate oil and residual oil is limited to 0.2% and 2.5% (wt), respectively. The hourly emissions from the dryer/cooler are limited to 43.08 lbs/hr of SO<sub>2</sub>, 27.00 lbs/hr of NO<sub>x</sub>, 63.00 lbs/hr of CO, 2.53 lb/hr of HF, and 10% opacity. Since the raw kyanite is a significant source of SO<sub>2</sub> and HF emissions, the permittee will sample the raw kyanite feed to the dryer/cooler on a daily basis for sulfur and fluoride analysis. The daily samples will be combined with subsequent daily samples and the composite sample will be analyzed at least once per month for total sulfur and fluoride content. On a monthly and annual basis, the permittee will calculate the controlled SO<sub>2</sub> and HF emissions from dryer/cooler using the results of the monthly sulfur and fluoride content of the raw kyanite samples collected and fuel sulfur content. In addition, the permittee will calculate the monthly and annual CO emissions using calculation methods approved by the South Central Regional Office. The permittee will retain records of production, fuel consumption, PEM, kyanite sulfur and fluoride content, fuel sulfur content, stack tests, operator training, semiannual compliance, and malfunctions. The Title V permit conditions located in section III(C)(1) lists the specific applicable requirements for the Willis Mountain dryer/cooler. The WWESP's monitoring requirements will be discussed in the Monitoring Section.

#### Willis Mountain sand dryer (Ref. W6)

The filterable PM and PM-10 emissions from the sand dryer (Ref. W6) are controlled by a wet cyclone (Ref. WCYC) having a design control efficiency of 85.0 % and 60.0%, respectively. The sand dryer is not subject to any current NSPS or NESHAPS. The sand dryer's annual production is limited to 25,000 tons/yr and fuel consumption is limited 5,000 gallons of distillate oil and 115,000 gallons of residual oil (calculated as the sum of each consecutive 12-month period). The maximum sulfur content of the distillate oil and residual oil is limited to 0.2% and 2.5% (wt), respectively. The hourly emissions from the dryer/cooler are limited to 1.80 lb/hr of PM, including condensible matter, 0.48 lb/hr of PM-10, including condensible matter, 11.41 lbs/hr of SO<sub>2</sub>, 0.19 lbs/hr of NO<sub>x</sub>, 2.40 lb/hr of CO, and 20/60% opacity. On a monthly and annual basis, the permittee will calculate emissions of SO<sub>2</sub> and CO emissions dryer using fuel sulfur content and calculation methods approved by the South Central Regional Office. The permittee will retain records of production, fuel consumption, PEM, fuel sulfur content, stack tests, operator training, semiannual compliance, and malfunctions. The Title V permit conditions located in section III(D)(1) list the specific applicable requirements for the Willis Mountain sand dryer. The WCYC's monitoring requirements will be discussed in the Monitoring Section.

#### IC powered dredge (Ref. Dredge)

The diesel engine's annual operating hours are limited to 2,000 hours/yr and fuel is limited to distillate oil with a maximum sulfur content limited to 0.2% (calculated as the sum of each consecutive 12-month period). The hourly emissions from the diesel engine are limited to 2.12 lbs/hr of SO<sub>2</sub>, 12.60 lbs/hr of NO<sub>x</sub>, 3.12 lb/hr of CO, and 20/60% opacity. The diesel engine is not subject to any current NSPS or NESHAPS. The permittee will keep records of the monthly and annual operating hours, operator training, periodic monitoring, and malfunctions. The Title V permit conditions located in section III(E)(1) lists the specific applicable requirements for the IC powered dredge. The IC powered dredge monitoring requirements will be discussed in the Monitoring Section.

## Stone Processing Plants

The East Ridge and Willis Mountain raw and finished kyanite processing equipment was manufactured prior to August 31, 1983, and are not subject to NSPS Subpart OOO per 40 CFR 60.670(d)(1). A portion of the kyanite processed at the Gieseke plant is not calcined, but is packaged and shipped after fine grinding. The kyanite processing equipment at the Gieseke plant that was manufactured after August 31, 1983 is subject to the provisions of NSPS Subpart OOO per 40 CFR 60.670(d)(1). However, mullite is not a listed non-metallic mineral in 40 CFR 60.671, and the portion of the Gieseke stone processing equipment that handle only mullite are not NSPS Subpart OOO affected facilities.

### East Ridge Stone Processing Plant

The East Ridge raw and finished kyanite processing emission units were manufactured after March 17, 1972, but prior to August 31, 1983, and are subject to the provisions of Chapter 9 VAC 5 Chapter 50. The SOP's annual particulate emission limits were established based on an annual throughput of 1,500,000 tons/yr of raw kyanite ore through the primary crusher feeder (Ref. E1). The permit requires partial or total enclosure for the specified emission units, wet suppression for the emission units not enclosed, and fabric filter for the Magnet building. The annual particulate emissions from raw and finished kyanite processing, except dryer/cooler (Ref. E4), are limited to 37.3 tons/yr of PM and 20.8 tons/yr of PM-10. The East Ridge primary and secondary crushers have a 15 % opacity limit per NSPS Subpart OOO. BACT for primary and secondary crushing is wet suppression and an opacity limit of 15%. BACT for tertiary crushing, stockpiles, belt conveyors, and truck loadout is wet suppression and 10 percent opacity. BACT for the Flotation building is total enclosure and 20/30% opacity. The permittee will retain records of monthly and annual throughput, testing, periodic monitoring, operator training, semiannual compliance, and malfunctions. The Magnet building's fabric filter (Ref. E5cBH) is subject to a 10 % opacity limit. The Title V permit conditions located in section IV(A)(1) lists the specific applicable requirements for the Willis Mountain stone processing equipment.

### Gieseke Stone Processing Plant

The Gieseke finished kyanite and mullite processing emission units were manufactured after August 31, 1983 and are subject to the provisions of Chapter 9 VAC 5 Chapter 50. However, only the kyanite processing equipment is NSPS Subpart OOO affected facilities per §40 CFR 60.671. The permit's annual particulate emission limits were established based on 30,000 tons/yr annual throughput of mullite and kyanite through the Lower truck dump hoppers (Ref. G6c, G6d) and 65,000 tons/yr of kiln production. The permit does not limit the Upper Plant's annual throughput due to the requirement to enclose the belt conveyors (Ref. G1a, G1c, G6g), Dry Slot storage bin, bucket elevator (Ref. G6h), and totally enclose the Upper Gieseke and Lower Gieseke buildings. Total enclosure requires a "no visible emissions" opacity limit per §40 CFR 60.672(e)(1). The fabric filters have a 7% opacity limit per §40 CFR 60.672. All fugitive stone processing emission units have a 10% opacity limit, which meets BACT for stone processing plants. The Upper Gieseke grinding mill classifier's fabric filter (Ref. G2BH), bagging machines' fabric filter (Ref. G3BH), and Lower Gieseke bagging machines' fabric filters (Ref. G8B1, G8B2) are permitted to operate 8,760 hr/yr at a controlled emission rate of 0.05 gr/dscm (40 CFR 60.672(a)(1)), therefore, an annual throughput limit is not required. The annual particulate emissions from finished kyanite and mullite processing, except kiln (Ref. G5), are limited to 161.5 tons/yr of PM and 62.7 tons/yr of PM-10. The permittee will retain records of monthly and annual throughput, initial performance testing, PEM, periodic monitoring, operator training, semiannual compliance, and malfunctions. The Title V permit conditions located in section IV(B)(1) list the specific applicable requirements for the Gieseke stone processing equipment.



### Willis Mountain Stone Processing Plant

The Willis Mountain raw and finished kyanite processing emission units, with the exception of the dryer and cooler, were manufactured prior to March 17, 1972 and have not been modified since, and are subject to the provisions of Article 14 of Chapter 9 VAC 5 Chapter 40. The SOP's annual particulate emission limits were established based on an annual throughput of 550,000 of raw kyanite ore through the primary crusher feeder (Ref. W1), 55,000 tons/yr of finished kyanite through the Magnet and Kyanite bagging buildings, 18,300 tons/yr through the truck loadout (Ref. W4g), 15,000 tons/yr through the truck dump (Ref. W8). The permit requires partial or total enclosure for the specified emission units, wet suppression for the emission units not enclosed. The annual particulate emissions from raw and finished kyanite processing, except dryer/cooler (Ref. W4) and sand dryer (Ref. W7), are limited to 5.6 tons/yr of PM and 1.3 tons/yr of PM-10. The stone processing annual emission factors per AP42 Section 11.19.2, Non-Metallic Mineral Processing dated January 1995 are more restrictive than the Process Weight Rate emissions per 9 VAC 5-40-1840. Therefore, the Process Weight Rate emissions have been streamlined out of the Title V permit. However, the existing source opacity limits of 20/60% are specified in the permit. The permittee will retain records of monthly and annual throughput, testing, periodic monitoring, operator training, semiannual compliance, and malfunctions. The Title V permit conditions located in section IV(C)(1) lists the specific applicable requirements for the Willis Mountain stone processing equipment.

Since there is not a regulatory requirement to limit hourly pollutant emissions from the entire facility, the facility-wide hourly emissions have not been included.

**Monitoring** - East Ridge dryer/cooler, Gieseke kiln, Willis Mountain dryer/cooler, Willis Mountain sand dryer, East Ridge plant, Gieseke plant, and Willis Mountain plant.

None of the controlled emissions from any single emission unit at this facility exceeds 100 tons/yr, and a Compliance Assurance Monitoring Plan is not required. The IC-powered dredge does not have add-on air pollution control devices, and monitoring is not required for this emission unit.

### East Ridge dryer/cooler (Ref. E5.1, E5.2), Gieseke kiln (Ref. G5), and Willis Mountain dryer/cooler (Ref. W4.1, W4.2)

The State Operating Permit requires the KMC to measure and monitor each WESP (Ref. EWESP, GWESP, WWESP) or equivalent control device for the flowrates of the scrubber liquid recycle, and fresh water make up, the pH of the scrubbing solution recycle stream, the secondary voltage (volts) and current (amps), inlet and outlet temperature, or alternative monitoring methods as approved by the South Central Regional Office for the WESPs. The operator will observe each WESP's predictive emissions monitor with a frequency of not less than once per shift (8-hour period) to ensure good performance of each WESP. The operator keeps a log of the observations for each WESP's predictive emissions monitor (PEM) reading. The WESP's secondary voltage (volts) and current (amps), flowrates of the scrubber liquid recycle stream, fresh water make up stream(s), inlet and outlet temperatures, pH monitoring device(s), and alternative monitoring methods as approved by the South Central Regional Office shall be continuously recorded. KMC has established the minimum scrubber recycle stream pH, flowrates of the recycle, and freshwater makeup streams; inlet and outlet stack temperature, and optimum secondary voltage and current for the electrostatic precipitator during the initial performance testing of each WESP (Ref. EWESP, WWESP). The permittee will keep adequate PEM records to demonstrate compliance to the required WESP control efficiencies. The permittee will establish the necessary PEM range(s) for the Gieseke kiln (Ref. G5) control device during initial performance testing.

Willis Mountain sand dryer (Ref. W7)

The State Operating Permit requires the KMC to measure and monitor the sand dryer's wet cyclone's (Ref. WCYC) differential pressure drop across the wet cyclone. The permittee will keep records of the daily pressure drop indicator observation.

East Ridge stone processing plant, Gieseke stone processing plant, and Willis Mountain stone processing plant.

Each fabric filter (Ref. E5cBH, G2BH, G3BH, G8B1, G8B2) is equipped with a device to continuously measure the differential pressure drop across the fabric filter. The permittee will keep records of the daily pressure drop indicator observation.

**Recordkeeping - East Ridge, Gieseke, and Willis Mountain Plants**

The permit includes requirements for maintaining records of all monitoring and testing required by the permit. In addition to previously discussed, these records include, but not limited to:

Annual production of kyanite/mullite/sand for the East Ridge (Ref. E5.1, E5.2) and Willis Mountain (Ref. W4.1, W4.2) dryer/cooler; Gieseke kiln (Ref. G5); Willis Mountain sand dryer (Ref. W7); East Ridge, Gieseke, and Willis Mountain stone processing plants, in tons per year; and IC-powered engine annual operating hours, calculated monthly as the sum of each consecutive 12 month period.

Annual fuel consumption of in Btus per year for the East Ridge (Ref. E5.1, E5.2) and Willis Mountain (Ref. W4.1, W4.2) dryer/cooler; Gieseke kiln (Ref. G5); and annual fuel consumption of distillate and residual oil, in gallons/yr for Willis Mountain sand dryer (Ref. W7), calculated monthly as the sum of each consecutive 12 month period.

Monthly and annual emissions calculations for SO<sub>2</sub> from the East Ridge dryer/cooler (Ref. E5), Gieseke kiln (Ref. G5), Willis Mountain dryer/cooler (Ref. W4), and Willis Mountain sand dryer, and IC-powered dredge using the results of the kyanite sulfur samples and calculation methods approved by the South Central Regional Office to verify compliance with the annual SO<sub>2</sub> emissions limitations. Annual emissions are to be calculated monthly as the sum of each consecutive 12 month period.

Monthly and annual emissions calculations for CO from the East Ridge dryer/cooler (Ref. E5), Gieseke kiln (Ref. G5), Willis Mountain dryer/cooler (Ref. W4), Willis Mountain sand dryer, and IC-powered dredge using calculation methods approved by the South Central Regional Office to verify compliance with the annual CO emissions limitations. Annual emissions are to be calculated monthly as the sum of each consecutive 12 month period.

Monthly and annual hydrogen fluoride and other HAP emissions from the East Ridge dryer/cooler (Ref. E5), Gieseke kiln (Ref. G5), and Willis Mountain dryer/cooler (Ref. W4) (in tons) using the results of the fluoride samples and other data sufficient to show compliance with annual HF and HAPs emission limits. The calculation method shall be approved by the South Central Regional Office. Annual emissions are to be calculated monthly as the sum of each consecutive 12 month period.

Operation and control device monitoring records for each WESP or equivalent control device (Ref. EWESP, GWESP, WWESP).

Scheduled and unscheduled maintenance and operator training to all air pollution control devices.

Results of all stack tests, kyanite/mullite sulfur and fluoride samples, visual emissions examinations (VEE), periodic monitoring, and air pollution control device performance evaluations.

All fuel supplier certifications.

## **Periodic Monitoring**

### **Testing**

East Ridge dryer/cooler (Ref. E4.1, 4.2), Willis Mountain dryer/cooler (Ref. W4.1, W4.2), Gieseke kiln (Ref. G5)

The October 18, 2002 permit required stack and visible emissions (VEE) testing of the East Ridge and Willis Mountain dryer/coolers' WESP (Ref. EWESP, WWESP) and Gieseke kiln WESP or equivalent control device (Ref. GWESP). The East Ridge and Willis Mountain WESPs (Ref. EWESP, WWESP) were tested starting December 12, 2002, which is within six months of the date of the Title V permit. Due to the short duration between the WESP initial performance test and issuance of the Title V permit, the permittee will be required to stack test the kiln's WESP or equivalent control device (Ref. GWESP) when it becomes operational and each dryer/cooler's WESP (Ref. EWESP, WWESP) in the fifth (5<sup>th</sup>) year of the Title V permit. The permittee will test each WESP or equivalent control device to demonstrate compliance to the total PM (PM=PM-10), NO<sub>x</sub>, SO<sub>2</sub>, and CO hourly emission limits and the 97.0 % control efficiencies for SO<sub>2</sub>. The source will perform both a Method 5 and Method 202 (back half) particulate stack tests on the WESP outlets. The SO<sub>2</sub> emissions are the result of kyanite and fuel sulfur content and the source will be allowed to calculate the WESP's inlet SO<sub>2</sub> concentration in lieu of an inlet side stack test. Since hydrogen fluoride (HF) is more reactive than SO<sub>2</sub>, achieving 97.0% control efficiency for SO<sub>2</sub> is equivalent to achieving 99.0% HF control, and a separate test for HF is not required.

Willis Mountain sand dryer (Ref. W7)

The permittee will be required to stack test the sand dryer's wet cyclone (Ref. WCYC) in the first year (1<sup>st</sup>) year of the Title V permit to demonstrate compliance to the PM hourly emission limits. The source will have to perform a Method 5 and Method 202 (back half) stack tests on the wet cyclone outlet.

**Weekly Observation for Visible Emissions - East Ridge dryer/cooler (Ref. E5.1, E5.2), Gieseke kiln (Ref. G5), Willis Mountain dryer/cooler (Ref. W4.1, W4.2), Willis Mountain sand dryer, IC powered dredge (Ref. Dredge), and East Ridge, Gieseke, and Willis Mountain Plants.**

Monitoring of opacity will require the source to, at least one time per week, observe for the presence of visible emissions from each dryer/cooler (Ref. E5, E4), kiln (Ref. G5), sand dryer (Ref. W7), and IC engine (Ref. Dredge), fabric filter (Ref. E5cBH, G2BH, G3BH, G8B1, G8B2) exhaust stacks, all total enclosures, process enclosures, and fugitive emission units at the East Ridge, Gieseke, and Willis Mountain stone processing plants, when these emission units are operating. If visible emissions are observed, the permittee will have the option to take timely corrective action to resume operations without visible emissions or perform a VEE in accordance with 40 CFR 60, Appendix A, Method 9 to assure visible emissions' compliance. If visible emissions observations conducted during a twelve (12) consecutive weeks period on the Willis Mountain sand dryer, IC powered dredge, East Ridge plant, Gieseke plant, and Willis Mountain plant show no visible emissions for a particular stack or emission unit, the permittee may reduce the monitoring frequency to once per month for that stack or emission unit. Anytime the monthly visible emissions observations show visible emissions, or when requested by DEQ, the monitoring frequency shall be increased to once per week for that stack or

emission unit. The permittee will keep a log of observations, any VEE recordings and any corrective actions. If any emission unit has not operated for any period during the week, this fact shall be noted in the individual log, and the visible emission observation for the idle emission unit will not be required.

## **Reporting**

The Title V permit contains the standard testing, malfunction, and compliance reporting requirements in Section VIII.

## **GENERAL CONDITIONS**

The permit contains general conditions required by 40 CFR Part 70 and 9 VAC 5-80-110, that apply to all Federal operating permit sources. These include requirements for submitting semi-annual monitoring reports and an annual compliance certification report. The permit also requires notification of deviations from permit requirements or any excess emissions.

## **Comments on General Conditions**

### **B. Permit Expiration**

This condition refers to the Board taking action on a permit application. The Board is the State Air Pollution Control Board. The authority to take action on permit application(s) has been delegated to the Regions as allowed by ? ? 2.1-20.01:2 and ' ? 10.1-1185 of the *Code of Virginia*, and the "Department of Environmental Quality Agency Policy Statement NO. 3-2001".

This general conditions cites the entire Article(s) that follow:

B.2. Article 1 (9 VAC 5-80-50 et seq.), Part II of 9 VAC 5 Chapter 80. Federal Permits for Stationary Sources

This general condition cites the sections that follow:

- B. 9 VAC 5-80-80. "Application"
- B.2. 9 VAC 5-80-150. "Action on Permit Applications"
- B.3. 9 VAC 5-80-80. "Application"
- B.4. 9 VAC 5-80-80. "Application"
- B.4. 9 VAC 5-80-140. "Permit Shield"
- B.5. 9 VAC 5-80-80. "Application"

### **F. Failure/Malfunction Reporting**

Section 9 VAC 5-20-180 requires malfunction and excesses emissions reporting within 4 hours. Section 9 VAC 5-80-250 also requires malfunction reporting; however, reporting is required within 2 days. Section 9 VAC 5-20-180 is from the general regulations. All affected facilities are subject to this section including Title 5 facilities. Section 9 VAC 5-80-250 is from the Title 5 regulations. Title 5 facilities are subject to both Sections. A facility may make a single report that meets the requirements of 9 VAC 5-20-180 and 9 VAC 5-80-250. The report must be made within 4 day time business hours of the malfunction.

## **U. Failure/Malfunction Reporting**

The regulations contain two reporting requirements for malfunctions that coincide. The reporting requirements are listed in section 9 VAC 5-80-250 and 9 VAC 5-20-180. The malfunction requirements are listed in General Condition U and General Condition F. For further explanation see the comments on general condition F.

## **PUBLIC PARTICIPATION**

A public notice is not required for an administrative permit amendment.

**COMMONWEALTH OF VIRGINIA  
Department of Environmental Quality  
South Central Regional Office**

**STATEMENT OF LEGAL AND FACTUAL BASIS**

Addendum to the July 29, 2005 & September 21, 2004  
Statement of Legal and Factual Basis

Kyanite Mining Company  
Located off U.S. Hwy. 15 four mile south of U.S. Hwy. 60 in Buckingham County  
Permit No. SCRO30677

Title V of the 1990 Clean Air Act Amendments required each state to develop a permit program to ensure that certain facilities have federal Air Pollution Operating Permits, called Title V Operating Permits. As required by 40 CFR Part 70 and 9 VAC 5 Chapter 80, Kyanite Mining Company has applied for a Title V Operating Permit for its Buckingham County facility. The Department has reviewed the application and has prepared a draft Title V Operating Permit.

Engineer/Permit Contact: \_\_\_\_\_  
Allen Armistead  
(434) 582-5120

Date: December 18, 2006

Air Permit Manager: \_\_\_\_\_  
David J. Brown

Date: December 18, 2006

Regional Director: \_\_\_\_\_  
T. L. Henderson

Date: December 18, 2006

## **FACILITY INFORMATION**

Permittee  
Kyanite Mining Company  
P. O. Box 486  
Dillwyn, Virginia 23936

### Facility

Kyanite Mining Company  
located off U.S. Hwy. 15, south of U.S. Hwy. 60 in Buckingham County

County-Plant Identification Number: 51- 029-00016

## **SOURCE DESCRIPTION**

NAICS Code: 212325 - Clay and Ceramic and Refractory Minerals Mining

Kyanite Mining Company (KMC) mines kyanite ore on-site, crushes the kyanite ore, concentrates the kyanite mineral using wet extraction processes, and dries the concentrated kyanite, and eliminates remaining impurities through a thermal oxidization/reduction process. Some of the refined kyanite is calcined into mullite, a similar material with different physical properties. Both kyanite and mullite are used for high temperature refractory materials and high voltage electrical insulators. The kyanite mining and kyanite/mullite processing facility includes the following operations: the Willis Mountain kyanite plant, which was constructed in 1957; the East Ridge kyanite plant, which was built in 1974; and the Gieseke kyanite/mullite plant, which commenced construction in 1985, but the kiln has not been completed. On October 18, 2002, a State Operating Permit (SOP) was issued to KMC that limited annual emissions from this facility to below Prevention of Significant Deterioration (PSD) permitting levels. The State Operating Permit (SOP) was amended on April 7, 2003; September 13, 2004; June 20, 2005; July 29, 2005; November 29, 2005; and May 22, 2006. This permit action is to incorporate the SOP amendments of June 20, 2005; November 29, 2005; and May 22, 2006, as well as a permit exemption of May 18, 2005, into the source's Title V permit. The Title V permit was last amended July 29, 2005 to include the SOP change for that same date.

The facility is a Title V major source of PM, PM-10, SO<sub>2</sub>, NO<sub>x</sub>, and CO. This source is located in an attainment area for all pollutants, and is a PSD synthetic minor source.

## **COMPLIANCE STATUS**

A full compliance evaluation of this facility, including a site visit, has been conducted. In addition, all reports and other data required by permit conditions or regulations, which are submitted to DEQ, are evaluated for compliance. Based on these compliance evaluations, the

facility has not been found to be in violation of any state or federal applicable requirements at this time.

## EMISSION UNIT AND CONTROL DEVICE IDENTIFICATION

The list of emissions units for this facility is large. A complete listing of the significant emissions units can be found in Section II of the Title V permit. A complete listing of the insignificant units can be found in Section VI of the Title V permit. The emission units associated with this modification consist of the following:

The SOP amendment of June 20, 2005 added the following equipment at the Willis Mountain Plant, which had been exempted from minor NSR permitting in a May 18, 2005 determination.

Reference No.	Equipment Description	Rated Capacity	Federal Requirements
	<b>dry kyanite processing equipment:</b>		
W4L, W4i	2 - 10' x 25' kyanite storage bins	40 tons/hr and 20 tons/hr, respectively	NSPS OOO
W5a-3, W5c	2 - 6' x 12' kyanite storage bins	20 tons/hr, each	NSPS OOO
Ref. W4j	1 - 9' x 25' kyanite storage bin	20 tons/hr	NSPS OOO
W4h	1 - bucket elevator	40 tons/hr	NSPS OOO
W4g1, W4g2	1 - Midwest International, 10ft. retractable with dust suction or equivalent, kyanite truck loadout	40 tons/hr, total for two spouts	none
W4k	1 - Midwest International, 10ft. retractable with dust suction or equivalent, kyanite truck loadout	20 tons/hr	none
	<b>sand processing equipment:</b>		
W6b2	1 - 32' x 14' sand storage bin	45 tons/hr	NSPS OOO
W7b2	1 - manual valve enclosed truck loadout	45 tons/hr	NSPS OOO

The November 29, 2005 SOP amendment added recycled oil as approved fuel for the following emission units.

Reference No.	Equipment Description	Rated Capacity	Federal Requirements
E5.1 & E5.2	East Ridge fluid bed dryer/cooler	30 tons/hr and a $34 \times 10^6$ Btu/hr (heat input) burner	none
W4.1 and W4.2	Willis Mountain dryer/cooler	10 tons/hr and a $13.8 \times 10^6$ Btu/hr (heat input) burner	none
W6	Willis Mountain sand dryer	6 tons/hr and a $4.0 \times 10^6$ Btu/hr (heat input) burner	none



The May 22, 2006 SOP amendment increased the throughput for Willis Mountain Plant truck loadout (Ref. W4g1, W4g2) and also added the following equipment at the Gieseke Plant.

Reference No.	Equipment Description	Rated Capacity	Federal Requirements
<b>Bagging Equipment</b>			
GB1	1 – 1000 ft <sup>3</sup> Ball Mill Bin	48 tons/hr	NSPS OOO
GB2	1 – Kyanite Truck Dump	40 tons/hr	NSPS OOO
GB3	1 – Kyanite Bucket Elevator	40 tons/hr	NSPS OOO
GB4	3 – 7500 ft <sup>3</sup> Kyanite Bins	48 tons/hr	NSPS OOO
GB5	3 – 7500 ft <sup>3</sup> Kyanite Bins	48 tons/hr	NSPS OOO
GB6	2 – 7500 ft <sup>3</sup> Kyanite Bins	40 tons/hr	NSPS OOO
GB7	1 – Bulk Truck Bin	40 tons/hr	NSPS OOO
GB8	1 – Bulk Truck Load-out	40 tons/hr	NSPS OOO
GB9	1 – 1000 ft <sup>3</sup> Bulk Bagging Bin	22 tons/hr	NSPS OOO
GB10	1 – Bulk Bagging Machine	22 tons/hr	NSPS OOO
GB11	1 – Air packing bin	1000 ft <sup>3</sup>	NSPS OOO
GB12	1 – Air Packing Bagging Machine	15 tons/hr	NSPS OOO
GB13	1 – Impeller Packing Bin	1000 ft <sup>3</sup>	NSPS OOO
GB14	1 – Impeller Packing Bagging Machine	15 tons/hr	NSPS OOO
<b>Screening Equipment</b>			
GS1	1 – 39’ 6” x 20” Mullite Conveyor Belt	50 tons/hr	NSPS OOO
GS2	1 – 9’ x 34’ Mullite Storage bin	24 tons/hr	NSPS OOO
GS3	1 – 63’ 5” Mullite Bucket Elevator	25 tons/hr	NSPS OOO
GS4	1 – 4’ x 8’ Two Deck Scalping Screen	25 tons/hr	NSPS OOO
GS5	1 – Roll Crusher	1 ton/hr	NSPS OOO
GS6	1 – 12’ x 34’ Mullite Storage Bin	10 tons/hr	NSPS OOO
GS7	1 – 84’ 5” Mullite Bucket Elevator	10 tons/hr	NSPS OOO
GS8	1 – Sweco 60” diameter x 60” high Three Deck Screen	5 tons/hr	NSPS OOO
GS9	1 – Sweco 60” diameter x 60” high Three Deck Screen	5 tons/hr	NSPS OOO
GS10	10 – 9’ x 8’ Product Collection Tanks	10 tons/hr each	NSPS OOO
GSDCS	1 – Scalping Screen	500 lbs/hr	NSPS OOO
GS11	10 – 14” x 3’ 2.5 HP Variable Speed Conveyors	10 tons/hr each	NSPS OOO
GS12	1 – 47’ 9” x 20” Reversible Belt Conveyor	40 tons/hr	NSPS OOO
GS13	1 – Indoor Truck Load-out	40 tons/hr	NSPS OOO
GS14	1 – 32’ 6” Bucket Elevator	40 tons/hr	NSPS OOO
GS15	1 – 16’ x 3’ Bagging Tank	5 tons/hr	NSPS OOO
GS16	1 – 16’ x 3’ Bagging Tank	5 tons/hr	NSPS OOO
GS17	1 – 16’ x 3’ Bagging Tank	5 tons/hr	NSPS OOO
GS18	1 – Bagging Machine	5 tons/hr	NSPS OOO
GS19	1 – Bagging Machine	5 tons/hr	NSPS OOO
GS20	1 – Bagging Machine	5 tons/hr	NSPS OOO

## EMISSIONS INVENTORY

2005 actual emissions for the facility are summarized in the following table.

Pollutant Emission in Tons/Year						
PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	HF
28.9	16.3	24.6	3.9	91.4	4.4	0.11

**EMISSION UNIT APPLICABLE REQUIREMENTS - East Ridge dryer/cooler (Ref. E5.1 and E5.2), Willis Mountain dryer/cooler (Ref. W4.1 and W4.2), and Willis Mountain sand dryer (Ref. W6)**

**Limitations**

Recycled oil has been added as an approved fuel for each of the subject units. Recycled oil has also been included as part of the fuel throughput limitation for each of these units. See Conditions III.A.1.e & f, III.C.1.e & f, and III.D.1.c & d.

**Monitoring**

There are no changes in the monitoring requirements for these units.

**Recordkeeping**

For the East Ridge dryer/cooler (Ref. E5.1 and E5.2) and the Willis Mountain dryer/cooler (Ref. W4.1 and W4.2) the previous permit requirement to maintain records of annual fuel consumption in Btus has not changed. The source must include the Btus from recycled oil.

For the Willis Mountain sand dryer (Ref. W6) the gallons per year of recycled oil consumed has been added to the required records.

**Testing**

There are no changes in the testing requirements for these units.

**Reporting**

There are no changes in the reporting requirements for these units.

**EMISSION UNIT APPLICABLE REQUIREMENTS - Stone Processing Equipment Requirements – Gieseke Plant**

**Limitations**

Emission Control requirements for the new equipment for this plant are listed in Conditions IV.B.1.i thru IV.B.1.l.

Throughput limitation requirements for the new equipment for this plant are listed in Conditions IV.B.1.o thru IV.B.1.q

Visible Emission Limit requirements for the new equipment for this plant are listed in

Condition IV.B.1.y

**Monitoring**

Monitoring Device requirements for the new fabric filters for this plant are listed in Condition IV.B.2.

**Periodic Monitoring**

Requirement for the new emission units have been incorporated along with the requirements for previously installed emission units under Condition IV.B.3.

**Testing**

Stack Test and Visible Emissions Evaluation requirements for the new emission points have been added to the permit under Condition IV.B.4.

**Recordkeeping**

Annual throughput record requirements have been added to the permit under Conditions IV.B.5.c and IV.B.5.d.

**Initial Notifications**

Notification requirements for the new equipment in this plant have been added under Conditions IV.B.6.c thru IV.B.6.e.

**Reporting**

There are no changes in the reporting requirements associated with the new equipment for this plant.

**EMISSION UNIT APPLICABLE REQUIREMENTS - Stone Processing Equipment Requirements – Willis Mountain Plant**

**Limitations**

The Throughput limit requirement, in tons per year, found in Condition IV.C.1.f has been changed to match the limit from the source's SOP. Also, the reference number of the associated units has been changed.

Emission Limits in Condition IV.C.1.i have been changed to match the limit from the source's SOP.

Emission Limits requirements have been added in Condition IV.C.1.j for the new equipment added to this plant.

New equipment was added to the Visible Emission Limit in Condition IV.C.1.k.

Visible Emission Limit requirements for the new equipment for this plant are have been added in Condition IV.C.1.p.

### **Monitoring**

There are no changes in the monitoring requirements associated with the new equipment for this plant.

### **Periodic Monitoring**

Requirement for the new emission units have been incorporated along with the requirements for previously installed emission units under Condition IV.C.2.

### **Testing**

Stack Test and Visible Emissions Evaluation requirements for the new emission points have been added to the permit under Condition IV.C.3.

### **Recordkeeping**

The reference number of the emission units associated with Condition IV.C.4.d has been changed to include new equipment at this plant.

### **Initial Notifications**

Notification requirements for the new equipment in this plant have been added under Condition IV.C.5.

### **Reporting**

There are no changes in the reporting requirements associated with the new equipment for this plant.

## **GENERAL CONDITIONS**

The permit contains general conditions required by 40 CFR Part 70 and 9 VAC 5-80-110 that apply to all Federal-operating permitted sources. These include requirements for submitting semi-annual monitoring reports and an annual compliance certification report. The permit also requires notification of deviations from permit requirements or any excess emissions.

The startup, shut down, and malfunction opacity exclusion listed in 9 VAC 5-40-20 A 3 cannot be included in any Title V permit. This portion of the regulation is not part of the federally approved state implementation plan. The opacity standard applies to existing sources at all times including startup, shutdown, and malfunction. Opacity exceedances during malfunction can be affirmatively defended provided all requirements of the affirmative defense section of this permit are met. Opacity exceedances during startup and shut down will be reviewed with enforcement discretion using the requirements of 9 VAC 5-40-20 E, which state that "At all times, including periods of startup, shutdown, soot blowing and malfunction, owners shall, to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with air pollution control practices for minimizing emissions."

### **INSIGNIFICANT EMISSION UNITS**

There have been no changes to the insignificant units at the facility. The insignificant emission units are presumed to be in compliance with all requirements of the Clean Air Act as may apply. Based on this presumption, no monitoring, recordkeeping or reporting shall be required for these emission units in accordance with 9 VAC 5-80-110.

There have been no changes to the insignificant units at the facility.

### **PUBLIC PARTICIPATION**

The proposed permit modification was placed on public notice in the Farmville Herald from November 1, 2006 to December 1, 2006. There were no comments received from the public.

**COMMONWEALTH OF VIRGINIA**  
**Department of Environmental Quality**  
**South Central Regional Office**

**STATEMENT OF LEGAL AND FACTUAL BASIS**

Addendum to the July 29, 2005; September 21, 2004, & December 18, 2006  
Statement of Legal and Factual Basis

Kyanite Mining Company  
Located off U.S. Hwy. 15 four miles south of U.S. Hwy. 60 in Buckingham County  
Permit No. SCRO30677

Title V of the 1990 Clean Air Act Amendments required each state to develop a permit program to ensure that certain facilities have federal Air Pollution Operating Permits, called Title V Operating Permits. As required by 40 CFR Part 70 and 9 VAC 5 Chapter 80, Kyanite Mining Company has applied for a Title V Operating Permit for its Buckingham County facility. The Department has reviewed the application and has prepared a draft Title V Operating Permit.

Engineer/Permit Contact: \_\_\_\_\_ Date: \_\_\_\_\_

Air Permit Manager: \_\_\_\_\_ Date: \_\_\_\_\_

Regional Director: \_\_\_\_\_ Date: \_\_\_\_\_

## **FACILITY INFORMATION**

Permittee  
Kyanite Mining Company  
P. O. Box 486  
Dillwyn, Virginia 23936

Facility  
Kyanite Mining Company  
located off U.S. Hwy. 15, south of U.S. Hwy. 60 in Buckingham County

County-Plant Identification Number: 51- 029-00016

## **SOURCE DESCRIPTION**

NAICS Code: 212325 - Clay and Ceramic and Refractory Minerals Mining  
Kyanite Mining Company (KMC) mines kyanite ore on-site, crushes the kyanite ore, concentrates the kyanite mineral using wet extraction processes, and dries the concentrated kyanite, and eliminates remaining impurities through a thermal oxidization/reduction process. Some of the refined kyanite is calcined into mullite, a similar material with different physical properties. Both kyanite and mullite are used for high temperature refractory materials and high voltage electrical insulators. The kyanite mining and kyanite/mullite processing facility includes the following operations: the Willis Mountain kyanite plant, which was constructed in 1957; the East Ridge kyanite plant, which was built in 1974; and the Gieseke kyanite/mullite plant, which commenced construction in 1985, but the kiln has not been completed. On October 18, 2002, a State Operating Permit (SOP) was issued to KMC that limited annual emissions from this facility to below Prevention of Significant Deterioration (PSD) permitting levels. The State Operating Permit (SOP) was amended on April 7, 2003; September 13, 2004; June 20, 2005; July 29, 2005; November 29, 2005; May 22, 2006; March 19, 2007, and is being amended concurrently with this Title V change. This permit action is to incorporate the SOP amendment of March 19, 2007 into the source's Title V permit, which is being processed as a Minor Modification as described in 9 VAC 5-80-210. Also, this permit action is to incorporate a SOP amendment that is being processed concurrently with this Title V change, which is being processed as a Significant Modification as described in 9 VAC 5-80-230. The Title V permit was last amended December 18, 2006 to include the SOP amendments of June 20, 2005; November 29, 2005; and May 22, 2006, as well as a permit exemption of May 18, 2005.

The facility is a Title V major source of PM, PM-10, SO<sub>2</sub>, NO<sub>x</sub>, and CO. This source is located in an attainment area for all pollutants, and is a PSD synthetic minor source.

## **COMPLIANCE STATUS**

A full compliance evaluation of this facility, including a site visit, has been conducted. In addition, all reports and other data required by permit conditions or regulations, which are

submitted to DEQ, are evaluated for compliance. Based on these compliance evaluations, the facility has not been found to be in violation of any state or federal applicable requirements at this time.

### **EMISSION UNIT AND CONTROL DEVICE IDENTIFICATION**

The list of emissions units for this facility is large. A complete listing of the significant emissions units can be found in Section II of the Title V permit. A complete listing of the insignificant units can be found in Section VI of the Title V permit. The emission units associated with this modification consist of the following:

The March 19, 2007 SOP amendment increased the throughput for the Gieseke Plant Ball Mill Bin (Ref. GB1). Also, a throughput correction was made for the Willis Mountain Plant to the truck loadout (Ref. W4k, W4g1, W4g2). These changes are being processed as a minor modification to the Title V permit.

The SOP amendment currently being processed changes the testing requirements of three bin vent fabric filters at the Gieseke Plant (Ref. GBDC1, GBDC2, GBDC3). The changes allow the source to test the three bin vent fabric filters, which are subject to the Method 5 particulate testing requirements of NSPS OOO, using an alternate test procedure as granted in a letter to the source dated March 26, 2007 (see attached letter). This change is being processed as a significant modification to the Title V permit.

### **EMISSIONS INVENTORY**

2006 actual emissions for the facility are summarized in the following table.

Pollutant Emission in Tons/Year						
PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	HF
42.1	26.2	40.7	4.2	92.5	5.1	0.12

### **EMISSION UNIT APPLICABLE REQUIREMENTS - Stone Processing Equipment Requirements – Gieseke Plant**

#### **Limitations**

Throughput limitation requirement listed in Condition IV.B.1.o was increase to 100,000 from 70,000 to match the corresponding change in the source's SOP. (from SOP Condition 41, based on March 19, 2007 SOP minor amendment)

#### **Initial Performance Testing**

Condition IV.B.4.c was added. In place of the NSPS OOO requirement for a stack test using Method 5 to determine compliance with the emissions standard, the source is allowed to do the following procedure:

“...the permittee shall conduct a Visible Emission Evaluations (VEE) in



accordance with 40 CFR Part 60, Appendix A, Method 9. The visible emissions associated with the stacks shall not exceed five percent opacity during the performance test for each stack. Each test shall have a duration of at least one hour consisting of 30 sets of 8 consecutive observations (at 15 second intervals) to yield a two minute average, if the opacity observed is zero percent for all 15 second observations during the hour. If any single observation during the first hour of observation exceeds zero percent opacity, the duration of the test shall be at least three hours consisting of 90 sets of 8 consecutive observations (at 15 second intervals) to yield a two minute average.”

There are no changes to the emission limits of the permit as a result of this testing requirement change. (from SOP Condition 102, based on concurrently processed SOP significant amendment)

## **EMISSION UNIT APPLICABLE REQUIREMENTS - Stone Processing Equipment Requirements – Willis Mountain Plant**

### **Limitations**

Throughput limit requirement Condition IV.C.1.e has been combined with Condition IV.C.1.f with the combined condition maintaining the limit requirement of 55,000 tons/year that was previously in Condition IV.C.1.f. (from SOP Condition 37, based March 19, 2007 SOP minor amendment)

## **GENERAL CONDITIONS**

The permit contains general conditions required by 40 CFR Part 70 and 9 VAC 5-80-110 that apply to all Federal-operating permitted sources. These include requirements for submitting semi-annual monitoring reports and an annual compliance certification report. The permit also requires notification of deviations from permit requirements or any excess emissions.

## **INSIGNIFICANT EMISSION UNITS**

There have been no changes to the insignificant units at the facility. The insignificant emission units are presumed to be in compliance with all requirements of the Clean Air Act as may apply. Based on this presumption, no monitoring, recordkeeping or reporting shall be required for these emission units in accordance with 9 VAC 5-80-110.

## **PUBLIC PARTICIPATION**

The proposed permit minor modification is not subject to Public Participation under 9 VAC 5-80-270 as stated in 9 VAC 5-80-210 D and 9 VAC 5-80-270 A. However, the proposed significant modification is subject to Public Participation under 9 VAC 5-80-270 as stated in 9 VAC 5-80-230 D and 9 VAC 5-80-270 A. Therefore, a public notice is required to be published, to be followed by a 30-day public comment period. The proposed permit modification was placed on public notice in the Farmville Herald for a comment period from May2, 2007 to June 1, 2007. Also no comments were received from the EPA during the review period.